

Code No: 54019

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B.Tech II Year II Semester Examinations, May - 2015

PRINCIPLES OF ELECTRICAL ENGINEERING

(Common to ECE, ETM)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Explain the procedure to find the solution of a differential equation using Laplace transform method.
- b) Find $i(t)$ in the circuit in figure 1 for $t > 0$. Assume that the switch has been closed for a long time.

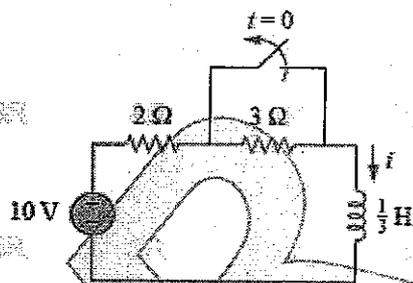


Figure: 1

- 2.a) Determine the y parameters for the two-port shown in figure 2. [7+8]

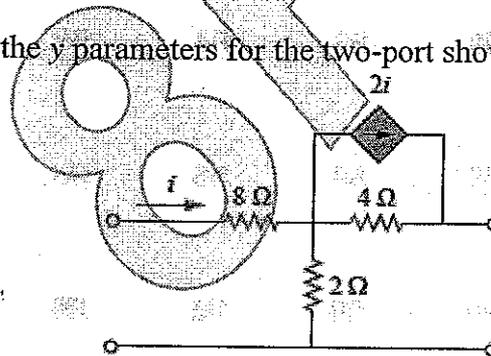


Figure: 2

- b) Obtain the condition of transmission parameters for two network connected in cascade. [8+7]
- 3.a) Explain the variations of characteristic impedance (Z_0), attenuation constant (α) and phase constant (β) with frequency with the help of neat sketch in band elimination filter.
- b) Design a composite high pass filter to operate into a load of 800Ω and have a cut off frequency of 1.2 kHz. The filter is to have one constant k section, one m-derived section with $f_{\infty} = 1.1$ kHz and suitable termination half section. [8+7]

- 4.a) Design symmetrical lattice attenuator with 30dB attenuation, working into 600Ω impedance. $N = \text{Antilog}_{10}(D/20) = \text{Antilog}_{10}\left[\frac{20}{20}\right] = 10.$
- b) Derive the design equations for
i) Symmetrical T attenuator.
ii) Symmetrical π attenuator. [7+8]
- 5.a) Explain applications of various d.c. generators.
b) A 500V dc generator is supplying a 30kW load has a resistance of 0.4Ω, shunt field resistance of 300Ω. Determine the armature current, induced emf. Allow a contact drop is 1V per brush. [7+8]
- 6.a) Explain the various losses in a DC motor.
b) A 250V d.c. shunt motor has an armature resistance of 0.5Ω and shunt field resistance of 300Ω, when driving at 600rpm at constant load. Armature takes 20A, speed is required to rise from 600rpm to 800rpm. Calculate the additional resistance to be inserted in the field circuit. [7+8]
- 7.a) Draw and explain the no-load phasor diagram of a 1-phase transformer. Discuss how primary leakage flux is accounted for in the phasor diagram.
b) A transformer when tested on full load is found to have copper loss of 1.8% and reactance drop of 4.8%. Calculate the full load regulation at power factors of
i) 0.8 lag
ii) UPF
iii) 0.707 leading. [8+7]
- 8.a) Discuss various applications of stepper motor and synchros.
b) Explain the working principle of a capacitor start induction motor. And draw the speed-torque characteristics. [8+7]

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